1

MULTIPLE FLAME TORCH APPARATUS

BACKGROUND OF THE INVENTION

This invention relates to a torch that is especially adapted for use in heating and soldering operations in very tight spaces, for example heating pipes or other tubular members and more particularly to the torch tip used with a torch body.

Problems have been encountered in performing soldering or other heating operations, for example, in the installation and repair of air conditioning and refrigeration equipment. At times the repair has to be made wherein tubing is located in corners or other areas which are difficult to access with single or two flame torch tips or where the operator can not move to a position to see a part of the tubular member that is opposite the operator.

In order to overcome problems such as the above, this invention has been made.

SUMMARY OF THE INVENTION

The torch includes a torch body that mounts a torch tip having a tip stem mounted to the torch body and an arcuately shaped tip head that advantageously extends through an angle of about 245° to 280°. The head tip has a plurality of outlet orifices, advantageously three, that are substantial equally angularly spaced from one another and are inwardly directed to open toward a central location.

One of the objects of this invention is provide a new and novel torch apparatus for soldering pipes and the like, particularly such members that are located in cramped quarters. Another object of this invention is to provide a new and novel torch tip for heating substantially the entire outer peripheral surface of a tubular member at the same time, including the side that is not visible when in cramped quarters. A further object of this invention is to provide a new and novel torch tip to focus concentrated heat directly at a tubular metal member with minimal residual flame and to minimize the chance of burning surrounding components and cabinetry.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a somewhat perspective view of a torch with the tip of this invention in position for heating a metal tubular member;

FIG. 2 is an enlarged longitudinal cross sectional view of a torch together with a side view of the torch tip heating a tubular member with longitudinal intermediate parts of the torch being broken away, the oxygen conduit and oxygen valve assembly being diagrammatically shown and a part of the tip head being shown in cross section;

FIG. 3 is a transverse cross sectional view of the torch that is generally taken along the line and in the direction of the arrows 3—3 of FIG. 2; and

FIG. 4 is an end view of the torch tip that is generally taken along the line and in the direction of the arrows 4—4 of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, the torch body, generally designated 11, includes a longitudinally elongated tubular handle or housing 14 which at its rear end mounts a torch butt 13 and at its opposite rear end mounts a torch head 12. Mounted to the torch butt and torch head are a fuel gas conduit 17 and an air or oxygen conduit 18 to extend within

the housing 12 and rearwardly of the torch butt. Hoses 28, 29 are connectable to the rear ends of the conduits 17, 18 for fluidly connecting the conduits to sources of supply (not shown) of pressurized fuel gas (for example acetylene) and oxygen (or air) respectively.

A fuel gas control valve assembly 19 is mounted to the torch head for adjustably controlling the flow of fuel gas from the conduit 17 to the inlet end of the fuel gas passageway 22 in the head 12 and through the fuel gas passageway 22 to the head bore 24 in a conventional manner. Similarly, an oxygen control valve assembly 20 is mounted to the torch head for adjustably controlling the flow of oxygen from the conduit 18 to the inlet end of the oxygen passageway 23 in the head 12 and through the oxygen passageway and to the head bore 24 in a conventional manner. A nozzle 25 is provided in the head bore 24 to have oxygen and fuel gas from the passages 23, 22 flow therethrough to the tip adaptor 27 which is threaded in the front end of the head bore. Since the structure of the torch body may be the same as that described in U.S. Pat. No. 3,279,701 to Falk et al which is incorporated herein by reference, for the most part the structure of the torch body 11 will not be further described. However, it is to be understood that other conventional torch bodies can be used in conjunction with the torch tip, generally designated 10, of this invention.

The torch tip 10 includes a longitudinally elongated tubular stem 30 which at its rear end mounts a compression sleeve 31 that is abutable against the wall defining the front end portion of the adaptor bore 32. A nut 33 is provided on the tubular stem for being threaded to the tip adaptor to retain the compression sleeve in abutting relationship to the tip adaptor in the desired angular relationship with the adaptor bore in fluid communication with the stem bore 34. By loosening the nut, the torch tip can be rotated relative to the tip adaptor about the central axis C—C of the tip stem 30 and then retained in the adjusted rotated position by tightening the tip nut.

The torch tip also includes a tip head 37 which is arcuately curved through an angle of at least about 240° and advantageously about 245° to 280°. Advantageously, as seen from the side (FIG. 2), the tip head is arcuately curved (nearly circumferentially) throughout its arcuate length. The tip head along its arcuate length is tubular from closely adjacent to one closed terminal end 38 to closely adjacent to its angularly opposite closed terminal end 39, and in transverse cross section may be circular. Further, the tip head has a plurality of outlet orifices open to passage 40 and toward a common point 45, preferably there being three orifices 41, 42, 43 respectively with orifice 41 being closely adjacent to tip end 38 and orifice 43 closely adjacent to tip end 39. For convenience, the surface 40B through which the orifices open toward point 45 will be referred to as the "angularly inner peripheral" surface in that it is most closely adjacent to point 45 while the opposite surface 40A will be referred to as the "angularly outer peripheral" surface. If the tip has three orifices, the orifices are advantageously spaced from one another by an angle of at least about 100° and preferably the orifices are equally angularly spaced (120° relative to one another) relative to point 45 and of the same linear spacing from said point. However, if more than three orifices are provided, the angular spacing would be less, but it would be desirable that the angular spacing be equal other than between the two orifices that are most closely adjacent to adjacent the tip head closed ends. The tip stem is joined to the outer peripheral surface of the tip head to have the stem passage outlet end open to the head passageway 40. With a three orifice tip 10, advantageously the central axis C—C of